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MAY 12, 1986

CHEMICAL & ENGINEERING NEWS

Cuba bolsters applied science, with emphasis on biotechnology
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NEWS

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News of the Week

■ **U.S.S.R. nuclear reactor accident puts U.S. government wheels in motion, monitoring fallout, activating interagency panel, triggering Congressional hearings.** **Page 4**

■ **Du Pont will buy agricultural chemicals subsidiary of Shell Oil for undisclosed sum.** **Page 5**

■ **EPA officer recommends delaying permit for chemical waste burn at sea until issues of concern to citizens, environmental groups have been resolved.** **Page 6**

■ **Studies on design and operation of facilities that process or store toxic chemicals and on ways to mitigate effects of accidental chemical releases commissioned by AIChE safety center.** **Page 8**

Business

Earnings of 30 top U.S. chemical companies increased an average of 14% in the first quarter over first-quarter 1985. **Page 8**

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Special Report

Cuban science is emphasizing biotechnology and research on the island's chief crop, sugarcane, although hampered by limited personnel and lack of modern lab equipment. **Page 31**

Chemical Earnings Revived In the First Quarter

Rebound by 15 largest companies ends five-quarter span of declining earnings, but income of 15 smaller firms falls a composite 9%

David Webber, C&EN New York

Many of the 30 largest U.S. chemical companies began to reap the benefits of last year's restructurings and work-force reductions during the first quarter of 1986. They were also aided by lower feedstock costs as a result of falling oil prices.

Working with lower payrolls and without many unprofitable lines of business, the 15 biggest firms recorded a composite 20% increase in net income, compared with first-quarter 1985. At the same time, however, the earnings of the smaller 15 companies, many of which depend on currently sluggish specialty markets, declined a composite 9% during the same period. In total, combined first-quarter net income for the 30 largest chemical firms rose 14%.

Pricing continued to bedevil the chemical industry, however. The producer price index for chemicals and allied products increased just 0.7% over first-quarter 1985, the fourth consecutive business quarter during which chemical prices rose less than 1%. As a result, even though companies reported sizable increases in sales volume for many chemical commodities, sales revenues climbed just 7% for the 15 largest firms, 3% for the other 15 companies, and just 6% overall. Still, the 6% year-to-year gain was the best since second-quarter 1984.

Many companies recorded solid success in their efforts to bolster the bottom line. Profit margins (after-tax earnings as a percentage of sales) jumped to 5.0% overall from 4.7% in first-quarter 1985 and from a recent nadir of 3.1% in fourth-quarter 1985.

On the other hand, those notable improvements were made against a poor first-quarter 1985, a period in which sales had declined 2% and earnings had fallen 24% from first-quarter 1984. A look at 12-month running data demonstrates that the industry still has a way to go to regain former financial performance levels. For the 30 firms, for example, composite net income for the 12 months ending March 31, 1986, was 25% below that for the 12 months ending March 31, 1985. Over the same span, composite sales rose just 1%, and overall profit margins slipped to 3.7% from 5.0%. Only 11 companies in the group raised earnings on a 12-month running basis.

Oil and gas producers and diversified manufacturing companies with substantial chemical operations did not fare nearly so well as the largest chemical companies. Stunned by the collapse of oil prices, the energy firms, though generally aided by profits from their chemical segments, mostly recorded large decreases in corporate net income during the first quarter. Composite earnings for 16 oil and gas companies fell 10% on a 12% decline in sales. Eleven firms in the group recorded lower net income or a deficit for the quarter. Only Enron reported a sales increase.

Because of the wider range of mar-

Chemical industry leaders for the first quarter

Sales

Rank 1986		$ Millions	Rank 1985
1	Dow Chemical	$2852.0	1
2	Monsanto	1745.0	3
3	Union Carbide	1669.0	2
4	W. R. Grace	1250.5	4
5	PPG Industries	1140.0	5
6	American Cyanamid	917.9	6
7	Chesebrough-Pond's	828.5	b
8	Celanese	747.0	7
9	Hercules	645.2	8
10	National Distillers	631.5	9

Earnings[a]

	$ Millions	Rank 1985
Dow Chemical	$175.0	1
Monsanto	118.0	2
PPG Industries	69.2	3
Celanese	51.0	7
American Cyanamid	49.1	5
Hercules	45.4	8
Chesebrough-Pond's	42.1	b
Air Products	39.1	9
Rohm & Haas	38.3	6
Union Carbide	37.0	4

Profitability

	Earnings as % of sales	Rank 1985
International Flavors	14.9%	1
Freeport-McMoRan	10.2	4
Nalco Chemical	8.6	2
Ethyl	8.5	8
Petrolite	7.7	3
Air Products	7.7	6
Loctite	7.2	5
Rohm & Haas	7.2	10
Hercules	7.0	14
Morton Thiokol	7.0	12

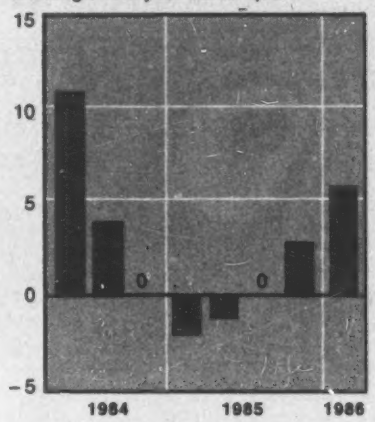
a After taxes. b Not meaningful since Chesebrough-Pond's not considered a chemical company until acquisition of Stauffer Chemical in March 1985. Note: For 30 companies listed on page 10.

Chemical industry 1986 first-quarter results

- Sales increased 6%
- Earnings rebounded
- Profit margins revived
- Production rose strongly
- Prices stagnated again

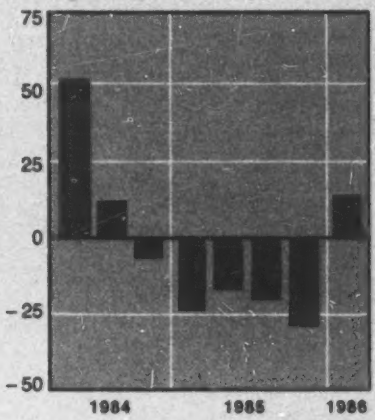
Sales

% change from year-earlier quarter



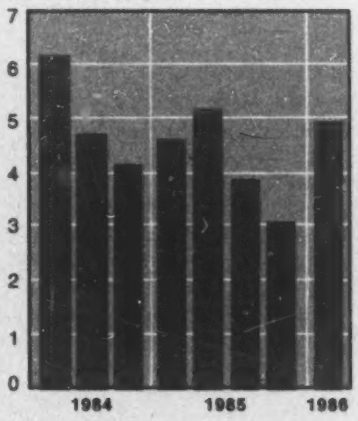
Earnings

% change from year-earlier quarter



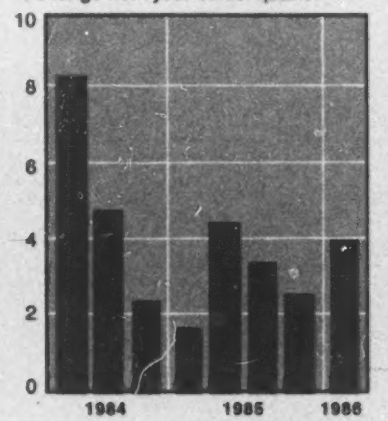
Profit margins

After-tax earnings as % of sales



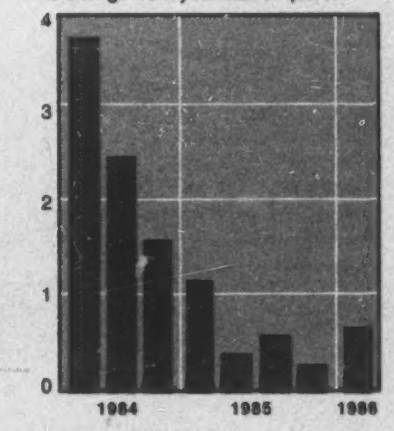
Production

% change from year-earlier quarter



Prices

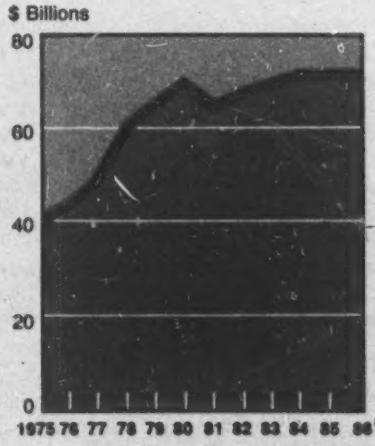
% change from year-earlier quarter



Sales in 1986 will be level, but net income will surge, pushing profit margins higher

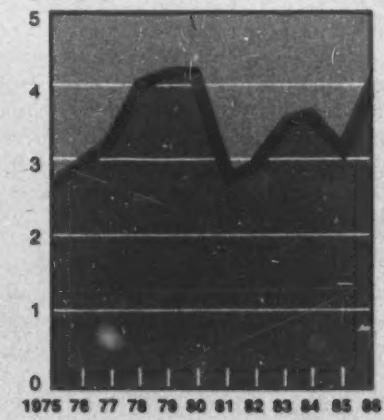
Annual sales

$ Billions



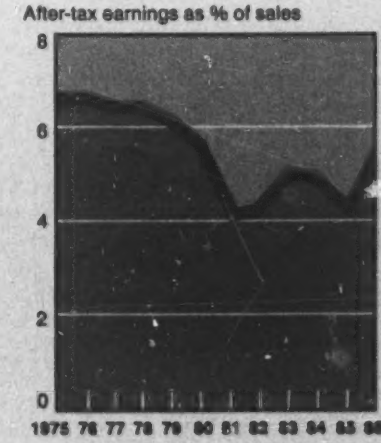
Annual earnings

$ Billions



Annual profit margins

After-tax earnings as % of sales



a C&EN estimates. Note: All sales, earnings, and profit-margin statistics are based on combined results of the 30 companies listed on page 10.

Chemical company earnings rose 14% in the first quarter

	FIRST-QUARTER 1986						12-MONTH RUNNING DATA			
	Sales ($ millions)	Earnings[a]	Change from 1985 Sales	Change from 1985 Earnings	Profit margin[b] 1986	Profit margin[b] 1985	Change from 1985 Sales	Change from 1985 Earnings	Profit margin[b] 1986	Profit margin[b] 1985
Air Products[c]	$ 508.9	$ 39.1	11%	10%	7.7%	7.8%	9%	8%	7.8%	7.8%
American Cyanamid[c]	917.9	49.1	4	15	5.3	4.8	−6	−22	4.2	5.1
Celanese[c]	747.0	51.0	0	42	6.8	4.8	−6	26	6.3	4.7
Chemed	94.4	4.3	6	8	4.6	4.5	7	1	4.8	5.1
Chesebrough-Pond's[c]	828.5	42.1	101	205	5.1	3.4	89	56	3.1	3.8
Crompton & Knowles	62.1	2.0	11	65	3.2	2.2	5	14	3.5	3.2
Dow Chemical[c]	2,852.0	175.0	4	59	6.1	4.0	3	−73	1.1	4.0
Essex Chemical	50.7	2.5	11	6	5.0	5.3	6	−21	4.4	5.9
Ethyl	378.0	32.0	0	14	8.5	7.5	−5	5	9.1	8.2
First Mississippi	65.5	−23.2	−4	def	def	5.7	−2	def	−5.2	7.3
Freeport-McMoRan	159.9	16.4	−26	−4	10.2	7.9	−22	−30	10.6	11.8
W. R. Grace[c]	1,250.5	−3.1	6	def	def	0.1	254	−33	0.5	2.8
H. B. Fuller	119.2	2.8	10	58	2.3	1.6	−16	−23	2.0	2.1
Hercules[c]	645.2	45.4	1	27	7.0	5.6	0	−25	5.5	7.4
International Flavors	148.0	22.1	22	25	14.9	14.5	11	9	14.0	14.4
International Minerals[c]	416.5	−2.2	1	def	def	7.4	−6	−79	1.4	6.6
Loctite	66.8	4.8	24	12	7.2	7.9	7	−2	9.1	10.0
Lubrizol	276.8	18.5	8	−5	6.7	7.6	6	−15	6.4	7.9
Monsanto[c]	1,745.0	118.0	7	36	6.8	5.4	4	−39	3.1	5.3
Morton Thiokol[c]	518.5	36.1	4	12	7.0	6.5	0	11	6.8	6.2
Nalco Chemical	178.5	15.4	9	−12	8.6	10.7	3	−4	10.2	11.0
National Distillers[c]	631.5	19.3	10	−6	3.1	3.6	5	10	2.5	2.4
Olin[c]	451.4	25.3	−5	108	5.6	2.6	−14	−28	3.1	3.7
PPG Industries[c]	1,140.0	69.2	10	−2	6.1	6.8	85	55	3.8	4.6
Pennwalt	267.1	13.0	8	90	4.8	2.8	67	5	5.7	9.0
Petrolite	75.8	5.8	−2	−17	7.7	9.1	−23	−27	6.9	7.3
Reichhold Chemicals	209.7	1.1	13	−56	0.5	1.3	9	def	−0.8	2.9
Rohm & Haas[c]	540.8	38.3	−2	−5	7.1	7.3	0	−11	6.8	7.6
Union Carbide[c]	1,669.0	37.0	0	−26	2.2	3.0	−9	−34	2.6	3.6
Witco	343.6	14.1	−6	28	4.1	3.0	−4	2	4.1	3.9
Total 15 largest companies	**$14,862.7**	**$739.6**	**7%**	**20%**	**5.0%**	**4.4%**	**−2%**	**−28%**	**3.4%**	**4.6%**
Second 15 companies	**$ 2,496.0**	**$131.4**	**3%**	**−9%**	**5.3%**	**6.0%**	**22%**	**−10%**	**5.2%**	**7.0%**
GRAND TOTAL	**$17,358.7**	**$871.0**	**6%**	**14%**	**5.0%**	**4.7%**	**1%**	**−25%**	**3.7%**	**5.0%**

a Excludes all significant extraordinary and nonrecurring items. b After-tax income as a percentage of sales. c One of 15 largest companies. def = deficit.

kets into which they sell, the group of 21 diversified manufacturers analyzed by C&EN reported more varied results. Du Pont, for instance, despite its large energy segment, boosted its net income 47% over first-quarter 1985. Last year, the company reduced its payroll substantially through a very large workforce reduction program. And Allied-Signal, based on restated statistics that partly take into account the merger of Allied and Signal last year and the spinoff of many lines of business into the Henley Group, increased earnings 39%.

Still, net income fell on a year-to-year basis at 11 of the firms. Overall, earnings dropped 2% on a 1% gain in sales. Koppers, NL Industries, and U.S. Steel lost money in the quarter, and double-digit earnings declines were registered by Aluminum Co. of America, Eastman Kodak, FMC, Georgia-Pacific, and Tyler (excluding the benefits of the settlement of a patent infringement suit).

Dow Chemical, with a 59% increase in net income on 4% sales growth, remained the top chemical company in terms of both revenues and earnings from operations. Dow chief executive Paul F. Oreffice attributes the gains to cost-reduction programs, including a 2700-person staff cut, and "an improved environment for many Dow businesses." According to Oreffice, some of the best performances in the quarter were turned in by the company's consumer specialties operations, particularly by Merrell Dow Pharmaceuticals, and by the epoxy and urethane chemicals groups.

Air Products had another solid quarter. The company has largely avoided the financial ups and downs of its other major competitors over the past two years. During first-quarter 1986, pretax operating profits rose 13% for its industrial gases segment and 8% for its chemicals segment (after the exclusion of nonrecurring items). Air Products continued to struggle with its engineering services segment, however,

Ground rules for C&EN earnings analysis

C&EN's quarterly report on financial performance of the U.S. chemical industry contains data from the 30 largest U.S. basic chemical companies and from 37 oil and diversified companies, each with more than $200 million in annual chemical sales.

To be included in the table of basic chemical producers, a company must have at least 40% of its sales in chemicals, and its chemical operations must be the largest single portion of the total operations. That is why Du Pont, for example, is included in the table of diversified manufacturers.

In referring to chemical sales, C&EN means those chemicals whose molecular composition has been changed in the course of manufacture. Hence, chemical sales include those of traditional categories of basic petrochemicals and inorganics, organic intermediates and inorganic compounds, polymers such as plastics and fibers, agricultural chemicals, and specialty derivatives.

In listing earnings, the survey gives after-tax income for continuing operations before nonrecurring items and extraordinary charges. Foreign currency translations are included.

Energy, diversified firms' earnings fell in first quarter

	% chemical sales	FIRST-QUARTER 1986 Sales ($ millions)	Earnings[a] ($ millions)	Change from 1985 Sales	Change from 1985 Earnings	Profit margin[b] 1986	Profit margin[b] 1985
OIL AND GAS COMPANIES							
Amoco	10%	$ 5,900.0	$331.0	−16%	−30%	5.6%	6.8%
Ashland	18	1,800.0	39.0	0	179	2.2	0.8
Atlantic Richfield	17	4,287.0	288.0	−26	−23	6.7	6.5
Chevron	6	8,900.0	320.0	−29	−10	3.6	2.8
Diamond Shamrock	18	950.3	−10.0	0	def	def	6.2
Enron	6	3,312.4	81.7	24	−24	2.5	4.0
Exxon	7	22,243.0	1.9	−4	52	0.0	0.0
Kerr-McGee	14	718.9	22.1	−11	−22	3.1	3.5
Mobil	4	14,100.0	440.0	−7	38	3.1	2.1
Occidental Petroleum	10	3,630.8	74.2	−2	−10	2.0	2.2
Phillips Petroleum	15	3,113.0	69.0	−21	−40	2.2	2.9
Shell Oil	16	4,666.0	276.0	−2	−7	5.9	6.2
Sun Co.	3	3,350.0	146.0	−9	15	4.4	3.5
Texaco	3	9,600.0	328.0	−20	59	3.4	1.7
Unocal	11	2,279.6	70.2	−18	−61	3.1	6.5
Williams Cos.	24	796.4	14.2	−24	−51	1.8	2.8
DIVERSIFIED MANUFACTURERS							
Allied-Signal	23	2,909.0	186.0	18	39	6.4	5.4
Aluminum Co. of America	5	1,177.3	1.4	−10	−79	0.1	0.5
Borden	33	1,136.4	36.7	5	6	3.2	3.2
Borg-Warner	28	895.5	49.4	12	11	5.5	5.6
Du Pont	38	7,169.0	404.0	−1	47	5.6	3.8
Eastman Kodak	22	2,345.4	48.6	10	−58	2.1	5.4
Engelhard	26	526.2	11.4	−9	−3	2.2	2.0
FMC	39	752.3	20.1	0	−54	2.7	5.8
GAF	50	176.0	15.0	0	34	8.5	6.3
General Electric	8	5,880.0	537.0	−5	5	9.1	8.2
Georgia-Pacific	4	1,604.0	30.0	2	−39	1.9	3.1
Kaiser Aluminum	13	582.2	7.2	15	nm	1.2	def
Koppers	44	261.7	−0.6	1	def	def	def
Eli Lilly	22	988.3	172.6	9	7	17.5	17.7
3M	15	2,069.0	181.0	9	7	8.7	8.9
Merck	13	921.1	157.8	8	20	17.1	15.4
NL Industries	40	359.2	−1.1	10	def	def	1.3
Pfizer	10	1,032.1	168.9	8	15	16.4	15.5
Tyler	41	230.2	0.9	5	−52	0.4	0.9
U.S. Steel	6	4,651.0	−257.0	−7	def	def	def
Vulcan Materials	30	200.6	6.9	1	−4	3.4	3.6

a From continuing operations excluding nonrecurring and extraordinary items. b Earnings as a percentage of sales. def = deficit. nm = not meaningful.

which lost $2.3 million before taxes.

After losing $59 million in fourth-quarter 1985, Monsanto resumed making money in first-quarter 1986, recording a 36% increase in net income compared with last year's first quarter. The company's results benefit in total from the inclusion of sales and earnings by the units added in last October's acquisition of G. D. Searle, as well as from the exclusion of sales and earnings by businesses both already sold and planned for shutdown or sale as part of the restructuring launched last year. In particular, Monsanto boosted pretax income from its chemicals segment, which has sold or will be selling several major facilities, by 161%. Pretax profits from crop chemicals inched up 2%, thanks to improved marketing of Roundup herbicide and despite lower shipments of Lasso herbicide.

Problems persisted, however, in the animal sciences unit, which lost $12 million before taxes, compared with a $13 million deficit in first-quarter 1985; electronic materials, which lost $15 million before taxes; and Fisher Controls, which lost $3 million before taxes. The pharmaceuticals unit lost $30 million pretax, largely offsetting the $38 million pretax profit turned in by the NutraSweet artificial sweetener operation. Monsanto is now isolating the costs of part of its biotechnology-based program. The unit, biotechnology product discovery, lost $8 million before taxes on no sales in first-quarter 1986.

Weak prices and sales volumes for fertilizers and the oil price drop overrode a big increase in pretax income from specialty chemicals in W. R. Grace's first-quarter loss of $3.1 million. Grace's specialty chem-

Energy companies helped by chemical earnings

The oil price collapse was bound to bring down corporate net income, but oil and gas companies could find some solace during the first quarter in the performance of their chemical operations. In most cases, after-tax earnings from the chemical businesses owned by energy companies increased sharply compared with first-quarter 1985. Exxon, Shell, and Enron (formerly HNG/InterNorth) registered triple-digit percentage gains in chemical net income, Mobil reversed a loss in the year-earlier quarter, and other companies prospered in the chemical arena as well.

Energy companies with chemical operations benefited from lower feedstock costs for petrochemicals and improvements in operating efficiency. Those positive factors more than offset the industry's continuing difficulty in raising product prices.

The most spectacular gain in the first quarter was made by Shell Oil's chemical segment, which increased net income 454% compared with first-quarter 1985. Shell Oil president John F. Bookout says that both lower raw material costs and higher agricultural chemical sales, coupled with lower manufacturing shutdown maintenance costs this year, were chiefly responsible for the strong profit increase. Still, he notes, selling prices were lower in nearly all business lines, particularly in polymers, intermediates, and solvents.

Enron, citing lower feedstock costs and higher margins, increased its chemical operations earnings 240%. Exxon, which has the largest chemical operation of any oil and gas producer, reported a 156% increase in after-tax income from chemicals. In the U.S., Exxon chemical net income rose to $61 million from $36 million in first-quarter 1985, a 69% increase. Overseas, Exxon chemical earnings jumped to $54 million from just $9 million in the year-earlier period, a 511% improvement.

Mobil was able to reverse last year's first-quarter deficit through better petrochemical margins in the U.S. and bringing its petrochemical plant in Saudi Arabia to full operational status. During first-quarter 1985, that facility was in its startup phase. Amoco's chemical operations earned 47% more in first-quarter 1986 than in last year's first quarter. Sales volumes for most chemical and polymer products were higher, and some commodity chemical margins improved, the company says. On the other hand, Amoco notes, results for synthetic fabrics and fibers and specialty chemical products declined from the year-earlier period.

Chevron attributes the 55% jump in its chemical after-tax earnings to higher sales volumes for industrial chemicals, primarily ethylene, polyethylene, and *p*-xylene, as well as lower feedstock costs. At Atlantic Richfield, Arco Chemical—the corporation's specialty and intermediate chemical operations—reported a 19% rise in net income, and Lyondell Petrochemical, Arco's integrated petroleum-processing business, earned $32 million compared with a loss of $26 million in first-quarter 1985.

Other energy companies not breaking out chemical after-tax results still reported strong gains by their chemical operations. At Diamond Shamrock, chemical sector earnings increased, the company says, because of lower energy costs and better chlorine demand from customers in the plastics industry.

By contrast, the Williams Cos.' Agrico Chemical subsidiary, which produces fertilizer products, recorded a pretax loss of $8.8 million in the quarter, compared with a $1.6 million pretax profit in first-quarter 1985. And Ashland Oil, though terming its chemical operation results "satisfactory," notes that operating income was below the year-earlier level.

	First-quarter earnings on chemical operations[a]		
$ Millions	1986	1985	% change
Amoco	$ 72.0	$49.0	47%
Atlantic Richfield	25.0	21.0	19
Chevron	31.0	20.0	55
Enron	10.7	3.1	240
Exxon	115.0	45.0	156
Mobil	32.0	−7.0	nm
Shell	72.0	13.0	454

a After-tax earnings. nm = not meaningful.

icals business earned 31% more before taxes than a year earlier, but agricultural chemicals lost $12 million pretax, and natural resources earned 30% less pretax than in first-quarter 1985. The company's smaller restaurant and general business groups reported good gains. In its financial statement, Grace excludes losses incurred in first-quarter 1986 by its retail operations. Those deficits are being deferred and will be charged against the expected gain when the company sells its interest in Herman's Sporting Goods and, as planned, the rest of its retail group.

Also suffering from the slumping farm economy was International Minerals & Chemical. IMC's troubled fertilizer segment lost $3 million before taxes in the quarter. President George D. Kennedy, who has been forced to issue a stream of downward revisions on earnings forecasts over the past half year, warns that operating results for second-quarter 1986 (IMC's fiscal fourth quarter) could be down from recent predictions because of a disappointing spring fertilizer season.

Among the 15 smaller companies, Pennwalt raised net income 90% on an 8% sales gain. The company, which restructured extensively last year, reports significantly better results for its chemicals group, thanks to higher earnings by fluorochemicals and a return to profitability by the inorganic chemicals division—mainly the result of closing its unprofitable Wyandotte, Mich., chlor-alkali plant late last year. Pretax chemical group profits, which accounted for 83% of pretax earnings, jumped 22% in the first quarter. Pennwalt's pharmaceuticals group also fared well, the company says, with earnings before taxes exceeding $4 million after a loss in the year-earlier quarter. Only the equipment group faltered; its pretax income fell 93%. □